



CASE REPORT

Management of the Radix Entomolaris and Paramolaris - Case Report

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ABSTRACT: Mandibular molars can have an additional root located lingually (the radix entomolaris) or buccally (the radix paramolaris). If present, an awareness and understanding of this unusual root and its root canal morphology can contribute to the successful outcome of root canal treatment. This report discusses endodontic treatment of mandibular molars with both of which in the Indian population. The prevalence, the external morphological variations and internal anatomy of the radix entomolaris and paramolaris are described.

Keywords: Anatomical variations, endodontic treatment, mandibular molar, radix entomolaris, radix paramolaris

The prevention or healing of endodontic pathology depends on a thorough chemo-mechanical cleaning and shaping of the root canals before doing a dense root canal filling with a hermetic seal. An awareness and understanding of the presence of unusual root canal morphology can thus contribute to the successful outcome of root canal treatment.

It is known that the mandibular first molar can display several anatomical variations. The majority of first molars in Indian population are two-rooted with two mesial and one distal canal. In most cases the mesial root has two root canals, ending in two distinct apical foramina. Sometimes, these merge together at the root tip to end in one foramen. The distal root typically has one kidney-shaped root canal, although if the orifice is particularly narrow and round, a second distal canal may be present.

A number of anatomical variations have been described in the mandibular first molar. F. abra Campos, and Bond reported the presence of three mesial canals and Stroner noted the presence of three distal canals. Like the number of root canals, the number of roots may also vary. An additional third root, first mentioned in the literature by Carabelli is called the radix entomolaris (RE). This supernumerary root is located distolingually in mandibular molars, mainly first molars. An additional root at the mesio-buccal side is called the radix paramolaris.

length using size 10 K-File or case of radix entomolaris.



Fig 1 Determination of radiographic

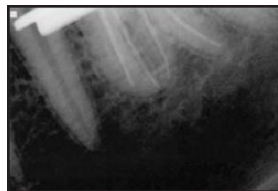


Fig 2 Gutta-percha cone fit, two separate distal roots distinguished

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radiograph following Ohturation

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Fig 3 Post-operative

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paramolaris (RP).

The identification and external morphology of these root complexes, containing a lingual or buccal supernumerary root, are described by Carlsen and Alexandersen. Although both macrostructures are rare in the Indian population, knowledge of their occurrence and location are important. In this article two such cases are entered. The prevalence, external morphological variations and internal anatomy of the radix entomolaris are described.

CASE REPORTS

Case 1: A 28 year old female patient reported to the Department of Conservative Dentistry and Endodontics, with a complaint of pain in the right lower posterior region. She gave a history of intermittent pain for the past one month, which had increased intensity since two days.

On examination, the right mandibular first molar displayed a restoration with tenderness on percussion. Thermal and electrical pulp testing of the tooth elicited a negative response. The pre-treatment radiograph showed widening of the periodontal ligament space and an additional root between the mesial and distal roots. Two radiographs with different horizontal angulations were taken which confirmed that the additional root was located disto-lingual to the mesial root. A diagnosis of a non vital right mandibular first molar with apical peri-odontitis was made and endodontic treatment was planned.

The tooth was anaesthetized and then isolated under rubber dam. Caries was removed and cavity was prepared using an endo access bur. One distal and two

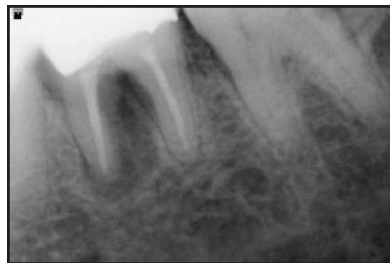


Fig 4 Pre-operative radiograph showing the missing distolingual canal

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mesial canal orifices were located using an endodontic explorer. Upon close inspection a dark line was observed between the distal canal orifice and the distolingual corner of the pulp chamber floor. At this corner overlying dentin was removed and a second distal canal orifice was detected. The canal lengths were determined using radiograph and an apex locator. (Fig-1) Cleaning and shaping was performed using protaper rotary instrument in crown down technique. Irrigation between each instrument was done using 2.5% sodium hypochlorite and 17% EDTA. After the master cone selection, canals were obturated with laterally condensed gutta-percha and AH plus sealer. Post endodontic restoration was placed and patient was recalled for follow up and placement of full coverage crown. (Fig-2, 3)

Case 2: A 42 year old female patient reported to the department of conservative Dentistry & Endodontics with the complaint of pain in the lower left posterior region. Patient gave a history of pain since two weeks and had a ceramic crown done by another dentist. Pre-operative radiograph revealed a faint outline of an additional root appearing between the mesial and distal roots. Clinical, radiographic examination of left mandibular first molar revealed that the tooth was symptomatic and endodontic retreatment was planned,

The tooth was anesthetized and isolated under rubber dam. The access cavity was prepared through the crown. On inspection of the pulp chamber floor a small hemorrhagic spot was noted buccally between the distal and the mesial orifices on the pulp chamber floor. Working length determined using radiographs and an apex locator, cleaning and shaping was done using rotary protaper files. Canals were irrigated with 2.5%, sodium

hypo-chlorite and 17% EDTA After selecting the master

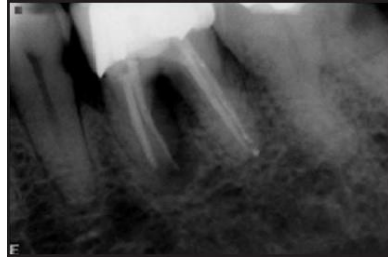


Fig 5 Radiograph showing Obturation of distolingual canal

entomolaris pramo/uris

cones, canals were obturated with gutta-percha and AH plus sealer using lateral condensation technique. The access cavity was restored and patient was recalled for followup. (Fig 4,5)

DISCUSSION

The presence of a separate RE in the first mandibular molar is associated with certain ethnic groups. In African populations, a maximum frequency of 3% is found, while in Eurasian and Indian populations the frequency is less than 5%. The etiology behind the formation of the RE is unknown and can be related to external factors during odontogenesis or to the penetrance of an atavistic gene or polygenetic system. It is hypothesized that the presence of RE adds to the stability of molars by providing an increased surface area of attachment to the alveolus. This anatomic structure has important clinical implications as their anatomical knowledge aids in avoiding endodontic mishaps and procedural errors.

Radix entomolaris (RE), in the present case, characterized by the presence of an additional distolingual root was detected in the preoperative radiograph itself. This signifies the importance of preoperative radiograph in the endodontic treatment. The 3-rooted mandibular first molar reported here had 1 mesial root with 2 canals and 2 distal roots with one canal each. This structure is the same as that of the other 3-rooted mandibular first molars described previously. However, RE characterized by the presence of 2 distal roots, the second one being the extra distolingual root, is not very common as a morphologic variant.

It has been reported that RCT in mandibular first molars have a significantly lower success rate than the other teeth. One of the reasons for non-healed root canal treatment is persistent infection caused by a missing canal and failure to remove all microorganisms and pulp remnants in the root canal system

Therefore a better knowledge of root anatomy is essential for

improving the healing rate of root canal treatment of mandibular first molars. Apart from the awareness about the possible existence and the racial prevalence of RE, it can be detected by thorough inspection of pretreatment radiographs, especially those taken from different angles.

Intra-oral periapical radiographs may serve as an

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important aid in identifying RE. It is suggested that the radiographs were successful in over 90% of the cases while identifying additional roots. Radiographic features like double periodontal ligament images or unclear view of distal root/canal indicate the possibility of RE.

In the present case, all the radiographs taken during the root canal procedure were clearly suggestive of RE and prevented the need for further investigations like cone beam computed tomography and 3-dimensional reconstruction which are useful to study the morphology of RE in a noninvasive manner. Clinically, the possibilities of detecting and managing RE can be enhanced by obtaining straight line access and modifying typical triangular shape of access preparation to a trapezoidal form. The values based on the mean inter orifice distance between extra distolingual canal and remaining canals, as found in a study by Tu et al, may also serve as a useful guideline to locate and treat RE. Further, good illumination and the use of accessories like magnifying loupes, microscopes etc are also valuable in locating and managing RE.

CONCLUSION

Unlike in other races, radix entomolaris (RE) in mandibular first molar is not a frequent finding in the Indian population. However, Dental clinician should be aware of the occurrence of RE as an anatomical variant. The detection of RE and its thorough cleaning, shaping and obturation would contribute significantly towards the success of primary endodontic treatment. Further, mandibular first molars have lower success rate following root canal treatment due to factors like missed canal. Awareness about RE helps in the diagnosis and

to better the overall prognosis for endodontic retreatment.

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